T-37-21

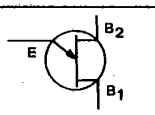
2N4948
2N4949

PN Unijunction Transistors
Silicon PN Unijunction Transistors

. . . designed for military and industrial use in pulse, timing, triggering, sensing, and oscillator circuits. The annular process provides low leakage current, fast switching and low peak-point currents as well as outstanding reliability and uniformity. Recommended usage includes:

- Silicon Controlled Rectifier Triggering Circuits — 2N4948
- Long-time Delay Circuits — 2N4949

PN UJTs



CASE 22A-01
STYLE 1

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MAXIMUM RATINGS (T_A = 25°C unless otherwise noted.)

Rating	Symbol	Value	Unit
RMS Power Dissipation, Note 1	P_D	360	mW
RMS Emitter Current	I_e	50	mA
Peak Pulse Emitter Current, Note 2	i_e	1	Amp
Emitter Reverse Voltage	V_{B2E}	30	Volts
Storage Temperature Range	T_{stg}	−65 to +200	°C

Notes: 1. Derate 2.4 mW/°C increase in ambient temperature. Total power dissipation (available power to Emitter and Base-Two) must be limited by the external circuitry. Interbase voltage (V_{B2B1}) limited by power dissipation, $V_{B2B1} = \sqrt{R_{BB} \cdot P_D}$.

2. Capacitance discharge current must fall to 0.37 Amp within 3 ms and PRR ≤ 10 PPS.

T-37-21

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Typ	Max	Unit
Intrinsic Standoff Ratio (V_{B2B1} = 10 V), Note 1	2N4948 2N4949	η	0.55 0.74	— —	0.82 0.86	—
Interbase Resistance (V_{B2B1} = 3 V, I_E = 0)	2N4948, 2N4949	R_{BB}	4	7	12.0	k ohms
Interbase Resistance Temperature Coefficient (V_{B2B1} = 3 V, I_E = 0, T_A = −65°C to +100°C)		αR_{BB}	0.1	—	0.9	%/°C
Emitter Saturation Voltage (V_{B2B1} = 10 V, I_E = 50 mA), Note 2		$V_{EB1(sat)}$	—	2.5	3	Volts
Modulated Interbase Current (V_{B2B1} = 10 V, I_E = 50 mA)		$I_{B2(mod)}$	12	15	—	mA
Emitter Reverse Current (V_{B2E} = 30 V, I_{B1} = 0) (V_{B2E} = 30 V, I_{B1} = 0, T_A = 125°C)		I_{EB2O}	— —	5 —	10 1	nA μA
Peak Point Emitter Current (V_{B2B1} = 25 V)	2N4948 2N4949	I_P	— —	0.6 0.6	2 1	μA
Valley Point Current (V_{B2B1} = 20 V, R_{B2} = 100 ohms), Note 2	2N4948, 2N4949	I_V	2	4	—	mA
Base-One Peak Pulse Voltage (Note 3, Figure 3)	2N4949 2N4948	V_{OB1}	3 6	5 8	— —	Volts
Maximum Oscillation Frequency (Figure 4)		f(max)	—	400	—	kHz

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Notes:
1. Intrinsic standoff ratio, η, is defined by equation:
$$\eta = \frac{V_P - V_{(EB1)}}{V_{B2B1}}$$
Where V_P = Peak Point Emitter Voltage
V_{B2B1} = Interbase Voltage
V_F = Emitter to Base-One Junction Diode Drop (≈ 0.45 V @ 10 μA)

2. Use pulse techniques: PW ≈ 300 μs duty cycle ≤ 2% to avoid internal heating due to interbase modulation which may result in erroneous readings.

3. Base-One Peak Pulse Voltage is measured in circuit of Figure 3. This specification is used to ensure minimum pulse amplitude for applications in SCR firing circuits and other types of pulse circuits.

FIGURE 1 – UNIJUNCTION TRANSISTOR SYMBOL AND NOMENCLATURE

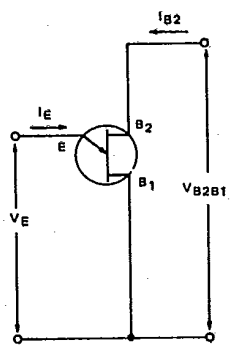

FIGURE 2 – STATIC EMITTER CHARACTERISTICS CURVES

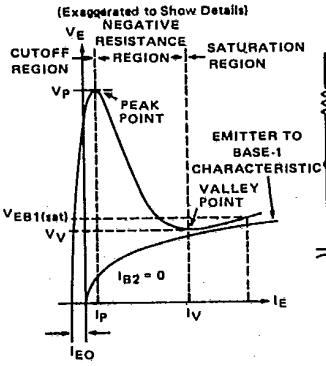

FIGURE 3 – V_{OB1} TEST CIRCUIT (Typical Relaxation Oscillator)

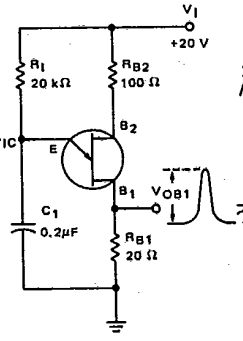

FIGURE 4 – F(max) MAXIMUM FREQUENCY TEST CIRCUIT